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## *American Electroplaters Society*

**Publication and Editorial Office**

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VOL. XV JULY, 1928 No. 7


## EDITORIAL

According to accepted traditions, WORK was a curse pronounced upon man by Diety when man was expelled from the Garden of Eden.

Then if this is true, the curse of God is better than the blessing of man.

Suppose the 1250 foreman plater executives were idle; that they had nothing to do but amuse themselves, could we make progress such as the A. E. S. has done, from reports of our Annual Meeting at Toronto?

There is not a doubt that working for one's bread and butter and shelter is the best thing that ever happened to the human race. But the chance to labor in the field of our chosen profession during leisure hours, compiling the experiences of the practical day to give unto your brother laborer in the vineyards of the Electro-Plating Industry, is a charity you owe yourself and one that will secure for you the feeling of being WORTH while, in this life, so write, members, write.

The best Insurance Policy a Plater can give his family is a membership in the American Electro-Platers Society, so Join, Platers, Join.

## PROGRESS REPORT

### The Stain Spotting of Cast Metals

(Summary of Research from March 1 to June 15, 1928.)

**By W. P. Barrows**

Research Associate of the American Electroplaters' Society
at the Bureau of Standards.

### Introduction

Investigations and observations extending over a period of more than a year have proved that there are at least two types of spotting-out. The first, observed only on lacquered sulfide or "oxidized" finishes occurs in the form of "dendritic" (tree-like) crystals usually with a black or nearly black color. These have been designated as "crystal spots" and have formed the principal subject of previous reports.

The second type consists of irregular areas of various colors to which the term "stain spots" has been applied. Stain spots which are observed most frequently on cast metals, may also appear on wrought metals whose structure has been rendered porous by distortion or by the action of various reagents. Although cast metals have been employed thus far in the experimental work, the information obbtained is probably equally applicable to the stain spotting of wrought metals.

The brass, bronze and malleable or grey iron castings employed for experimental purposes were made at the plants, and before shipment to the Bureau of Standards were prepared in the usual manner up to the point where they would normally enter some solution. All castings were of a type known to give frequent trouble for stain spotting. In accordance with the usual practice, the bronze or brass castings were copper plated and oxidized; and the iron castings were brass plated. A tentative standard method of cleaning and plating was adopted for each type of material, and the effects of modifications of this procedure upon the tendency toward staining were observed.

Preliminary experimental work led to the following general conclusions:

(1) Stain spots may occur on either oxidized or unoxidized finishes. Crystal spots occur only on the finishes which contain sulphur such as the oxidized finishes or black nickel deposits.

(2) Stain spots occur on both lacquered and unlacquered specimens while crystal spots occur only on lacquered objects.

(3) Stain spots occur on both plated and unplated castings.

(4) Moisture in the surrounding atmosphere is necessary to produce stain spots. Specimens that were exposed for several weeks at zero humidity without spotting, spotted badly in a few hours upon removal to an atmosphere of 90 per cent humidity.

(5) Stain spots usually occur in a humid atmosphere in a few hours while crystal spots may not appear until weeks or months after finishing.

(6) Stain spots are usually due to pores in the casting, either present originally or produced by the action of various solutions. This conclusion is drawn from the frequent presence of a small dark spot in the center of each stain, and from the fact that in many cases stains reappear at the same points when the stained specimens are stripped and polished to a new metal surface and then replated and refinished. The stains frequently reappear at the same points after two or more refinishing operations. These observations confirm those made by Graham* and others.

(7) The stains are due to the presence of "hygroscopic" (moisture absorbent) compounds occluded or formed in the pores of the metal by the action of cleaning, plating, or coloring solutions.

(8) Either alkaline or acid compounds may cause stain spotting.

(9) Moisture in the atmosphere absorbed by salts in the pores of a metal may cause the salts to "creep" out over the surface producing a stain or in extreme cases, a crystallization of solid material on the surface of the object.

From these preliminary observations it is evident that the occurrence of stain spots might be prevented or at least reduced, by (1) eliminating pores from the castings, (2) preventing staining compounds from entering into or remaining in the pores, or (3) by excluding moisture from access to the pores after the articles are finished. Exploratory work has been done on all three of these possibilities. Certain encouraging results have been obtained, but no definite recommendations can be made until more extensive tests are conducted, and until observations are made over a longer period. The following statement represent indications and not conclusions, and are included in this report

*Electroplaters' Review, March, 1927.

merely in order that those who have experienced difficulty with stain spotting, or who have tried these or other remedies may advise us as to whether their experience agrees with ours.

**(1) Reduction of Porosity of Castings**

It is at least possible that less porous castings might be made by changing the foundry conditions such as the composition or temperature of the molten metal, the design of the patterns, or the character of the molds. Experimental work on this subject must be conducted in a commercial foundry, as it is impractical to make such castings on a small scale. Specimens of cast iron parts received from one plant indicate that by a simple change in design, resulting in a thicker cross section, a marked decrease in porosity was produced. If confirmed by further observations, this result suggests a very practical solution of at least a part of the spotting-out problem.

**(2) Elimination or Exclusion of Salts from the Pores**

Attempts to fill the pores with some inert material, such as glycerine or lacquer, that might prevent the absorption of alkali compounds during the cleaning or plating processes, were unsuccessful.

Efforts to fill the pores with a neutral solution, such as a nickel bath, by first plating the castings with nickel before they entered an alkaline or cyanide solution did not result in any decrease in the spotting.

Attempts were made to introduce chromic acid into the pores of grey iron castings by treating them in boiling chromic acid (25 g/L), or (3.5 oz/gal) in the hope that this would neutralize any alkali that might enter the pores during the subsequent cleaning or brass plating process. No improvement was observed.

Treatment of brass plated cast iron with acetic acid (50 g/L or 8 oz/gal); with chromic acid (25 g/L or 3.5 oz/gal); with hydrochloric, sulfuric or nitric acid (30 g/L or 4 oz/gal); with cream of tartar (6 and 60 g/L or 0.8 and 8 oz/gal); followed in each case by thorough rinsing; failed to produce any decrease in the spotting.

As all the observations indicated that the stains on plated metals are due largely to hygroscopic compounds of sodium or potassium, the elimination of such compounds from the cleaning, plating and coloring solutions seems desirable. That such substitutions are sometimes practicable and beneficial is indicated by the report

made to us by Mr. E. R. Canning of Birmingham, Eng., that less staining on oxidized brass is encountered, if the metal was plated in an acid copper bath and then colored with ammonium sulfide. This observation was confirmed in our experiments, provided no alkaline cleaner was used prior to the acid copper plating.

The substitution of other methods of cleaning, such as organic solvents or pumice scrubbing, instead of the alkaline cleaners, is effective in reducing spotting, but is not very practicable. Further work will be required to develop simple, effective methods of cleaning that will not involve any sodium or potassium compounds. It will be still more difficult, if at all feasible, to develop brass plating solutions that do not contain sodium or potassium compounds.

### (3) Exclusion of Moisture from Access to the Finished Surfaces

If it were feasible to keep the plated articles in a practically dry atmosphere no stain spotting would occur. This is of course not practicable, but it is desirable to avoid storage of such products in rooms with high humidity.

It is therefore necessary to depend upon some coating to exclude the moisture from the pores. Experiences with other applications of lacquers have shown that lacquers containing phenol condensation products, such as Bakelite lacquer, are more nearly impervious to moisture than are the nitro-cellulose lacquers. Our experiments up to this time have shown that the tendency toward spotting out is greatly reduced by substitution of Bakelite lacquer for the nitro-cellulose lacquer. The improvement is most marked on brass castings in which the pores are less numerous and more isolated than in cast iron. Porous iron castings are likely to absorb so much alkali that it attacks and destroys the lacquer coating. Even if more extensive observations confirm the advantages of Bakelite it will still be necessary to take every precaution to reduce the porosity and the absorption of alkaline compounds in the pores.

Further experiments will be made upon the possible improvement of lacquers, either by changes in their composition, or by treatments subsequent to the lacquering.

It is at least evident that there is no panacea for stain spotting, though it can apparently be decreased by suitable precautions.

## VOLTMETER, AMMETER, RHEOSTAT

### Extracted from Platers Reminder, Philadelphia Branch By Mr. Floyd Taylor of the Hanson, Van Winkle, Munning Company

I have been asked to talk on the voltmeter, the ammeter, and the rheostat. You Know, if you had a steel yard you could weigh with it, or you could guess with it, but it wouldn't be of much value to you unless you could interpret the guess and reproduce the guess. Now a steel yard rather accurately represents the rheostat in the plating room circuit. By means of sliding things around, you can get adjustments. But the weights that you slide and the notches on the beam represent the ammeter and voltmeter because by means of the weights and notches you are able to get results that can be read, can be written down, can be reproduced, and can be transmitted to other people. The great value, of course, of weights and measures is the fact that they form units of permanent record, and in these days of communications, our weights and measures are the things that enable us to communicate from one fellow to the other. You weigh out so many ounces of nickel salts because you have it written down or it is in your memory or in a formula, that you need so many ounces of nickel salts to so many gallons of water. So the transmission of data from one fellow to another is one of the great advantages of having reproducing instruments, instruments that can be read. The rheostat, as I have said, is the instrument that is used for adjustment; the voltmeter and ammeter are instruments to do the reading and recording. It may seem there is no difference between a voltmeter and an ammeter, in their appearance. I will just make a little sketch of what a voltmeter looks like inside. (Draws.) There we see a permanent magnet, with a north and south pole. Magnets are made of specially heat treated steel so as to retain there magnetism over a long period of time. Between the two poles, mounted on a pivot so it will turn, is a small coil of wire. That coil of wire is connected with a pair of leads leading outside the voltmeter. The coil is maintained in the position I have shown here by means of a circular spring. On the center shaft is mounted a pointer which is going to run across a scale which you can read. And in this position, we will denote this by zero—that is the zero mark of the meter. As soon as a small current is allowed to go through this coil (and obviously as the coil has to be very small, the current that can be allowed to go through it is

very small) that coil becomes magnetized and as soon as it becomes magnetized, the magnetic force in that coil is immediately affected by the magnetism of this permanent magnet; we have two forces acting against each other, with the result that this coil will turn, and if the amount of current that goes through that coil is sufficient to overcome the spring pressure that coil will finally turn ninety degrees. Here is what that coil is attempting to do, in this turning motion. Here we have a magnet, north and south pole (draws), and if I put between the poles a coil of that character, the magnetic lines of force would tend to thread from the north pole to south pole. A minimum number of those lines of force will go through that coil because the coil actually lies parallel to the direction of those lines. Now that coil has a great desire, a desire in proportion to its strength, to turn itself in such a way that the maximum number of lines of force in the field can thread through it. To put it another way, the coil is much more comfortable when it is chock full of lines of force than when they are just going across from top to bottom of it. That is how this instrument works. Now that is a voltmeter. If you apply these two leads, as I will show you, in a minute, in a different diagram, across any two parts of a circuit, in which there is electrical energy, you will find that the difference of electrical pressure between those two points cause a current to flow in that coil, and that causes a deflection of the needle. The ammeter, I told you, is exactly the same. So it is. To illustrate it more clearly, I will draw a simple plating circuit in which we will show the ammeter and voltmeter. Your circuit starts out from the positive side of the dynamo, goes to your anode rod, across the tank to the cathode, and back to the negative side of the generator. Into that circuit, and it makes no difference by the way, as far as the instrument reading is concerned, we put our ammeter. A lot of current passes across this device here, called the ammeter shunt, from the two ends of which we have tapped these two little wires leading into the ammeter, and we get an ammeter reading, because what the ammeter is doing, it is reading the voltage drop across the two ends of that shunt at different currents in the shunt. Now one side of the voltmeter is connected down here to the negative side of the dynamo. Where we put the other side depends on where you want to read the voltage. Would you like to read the voltage at the anode to cathode? If so, you take the other wire and attach it to the anode. I am assuming the resistance of the bus bar from

the negative side of the generator to the cathode is nothing. You then get the voltage from anode to cathode. If you want to read the line voltage and find what the dynamo is doing at the tank, you would simply take this lead off and carry it up there, and then you read the voltage across the dynamo. So that the voltmeter, depending upon where you tap one of your wires, will give you the reading of the voltage. The two wires leading from the ammeter are permanently attached to the ends of the shunt, and they have to be carefully attached because the difference in electrical pressure across that shunt on which the ammeter must operate is very small.

Now, before we get to rheostats, of course we want to answer the question, a fair question, too, I think, "Why do you have voltage in a plating room?" The volt is the unit of electrical pressure; that is the force that drives the current pushes it along, and it will go along directly proportional to the amount of force you have pushing it, and inversely proportional as it is called, to the resistance that is offered to its flow. That is Ohm's law. And that answers the question "Why voltage" in a plating circuit, because you have the resistance of the solution to overcome. You have this thing that has been termed anode and cathode polarization to overcome. Let's say, looking at it in a crude way, but what seems to me an illuminating way, you have to force the current to jump off the anode into the solution, then move across the solution, and when it gets across the solution, you have to force it out of the solution into the cathode. The voltage, therefore, is the pressure that is needed to force things along.

If you made a crude diagram of the potential drop, that is, the loss of voltage from anode to cathode, it would look something like this (draws). This vertical plus line represents the anode rod, and the other line, the negative line, represents the cathode rod. Here we have the single pole drop of the anode, so-called anode polarization. Here we have the drop in the solution, and here you have the drop from the solution to the cathode, known as cathode polarization. In trying to get some figures that I consider reliable to show you in figures what some of these values might mean, I took the Bureau of Standards Circular 346 on chromium, and have copied from it a few figures that I am going to write up here, explaining this diagram to you. It is stated in the paper that the distance from the anode to the cathode was ten centimeters (roughly, 5″). The paper states that under the

plating conditions given, which were that this particular solution was run at 10 amperes per sq. decimeter, that is, about 100 amperes per square foot, that the total voltage required to force that current across that solution was 4½ volts. In other words, if we had taken that voltmeter and tapped it across the bath in this particular diagram, it would have read 4½ volts. Now the question is, where is the 4½ volts used up? You have used up 4½ volts of electrical pressure going from anode to cathode. Where was it used up? According to the diagram, .8 of a volt was used up in getting the current reluctantly to step off the anode into the solution; the drop in the solution is 2.7 volts and the drop from the solution to the cathode is 1 volt. Now if you add these figures you will see they add up 4½. I want to particularly call your attention to the fact that the whole 4½ volts was used in this diagram because in the discussion of rheostats I am hopeful that you can follow the fact that the sum of the voltages all through a given circuit add up to the total line voltage. In other words, we will take the diagram of the plating bath in a minute and go around that diagram with the assumption that we are starting off with six volts on our dynamo, and we will find as we go through the circuit every time we get back to the point we started that we will add up six. Now what is the ampere? We asked "Why voltage," now let's do the same with the ampere. I do not know why it is, but it is a fact that the current actually is what does the metal deposition. It seems to me that "Why the amperage?" is answered by that. Current and time are the two essential factors in electrical deposition, as far as electrical energy is concerned. One other thing that perhaps you are not so familiar with that I would like to point out and that is this. Electroplating as I see it, is a transfer of electrical energy into electrochemical energy. In other words, it is a change of energy from one form to another. You feed into a solution electrical energy; you get out of it an electrochemical phenomena; namely change in the character of the metal. The metal is in solution, in other words, it is in liquid form you might say. When it is deposited, it is in metal form, a different form. It is different form, just as ice is water in a different form. In the plating bath, you have this change from a liquid to a solid. You have done something to it, and therefore you have expended energy on it. Every expenditure of energy we know of in mechanics can be applied to a scale and drawn in figures that are areas. You probably all know that the horsepower

of a steam engine is obtained in tests by taking what is known as an engine card. I haven't time to tell you exactly how that is done, but nevertheless this engine card is taken, it is measured carefully, knowing the spring scale at which it is taken, and it is the scale on the back, a pin, that draws the curve, and actually the horsepower of the engine can be calculated from the area of the curve. Now in plating, you have a diagram like this: $E\overline{\frac{|\ W\ |}{I}}$ "E" is the voltage, "I" is the amperage, the current. If those were plotted to scale and the one side multiplied by the other, we would have the area of the rectangle; in other words, you have an expression of the amount of energy that you had in that circuit. And those two figures multiplied together, E and I, give us what are called by electrical people, watts. The kilowatt you hear about is 1,000 watts. That is the electrical energy in a circuit that you are converting into plating, into electrical deposition. The horizontal line represents the current only, and that line ("I") is the line that actually does the plating. So that your plating is done by the ampere hours, generally written IT. Now notice this, and this is one of the points that I want you to get, and think about. The part that does the plating has no element of voltage in it at all. Consequently, if it were possible to place at zero volts, you would be that much better off. IT is what does the plating. But what you are paying for is EIT, or kilowatt hours. IT is what does the plating. The energy you are paying the light company for is to be found by multiplying the voltage times the current times the time you had to run it, while the amount of plating itself would be the number of amperes that flow into the plating bath, multiplied by the time that they flow.

Now the reason I have pointed this out to you is that I have shown you that this, EIT, is what you have to pay for, and this, IT, is what you get, and consequently the lower you keep E, the cheaper it is going to be to your plating. In other words, you don't want to plate at high voltage; you want to plate at a low voltage, and as low as can be. That is to say, if we could have a dynamo that would give us exactly 4½ volts on this other bath here, with no rheostat or anything of the sort, we would have reduced this "E" to the lowest possible value, as long as it can go and produce enough energy to force that electrochemical change to take place.

Now let's move on to the question of the rheostat and find

out what this rheostat does and why it has to be there. (Draws plating circuit with resistance in.) Remember now we have got the ammeter, the rheostat and the voltmeter all in now. Rheostats are of two general types, the so-called banjo or series type, and the so-called parallel coil type, and I want to explain both types to you diagrammatically because they are slightly different in their behavior, just enough different in their behavior to be a little puzzling until you understand them. I am going to draw a series rheostat in here. (Draw rheostat in series with bath and dynamo.) That is a series type rheostat. It has an arm on it and a handle. Now you can see when the handle stands in the position I have shown there, the circuit goes up the handle, through that bunch of resistance, over across the tank to the other side of the circuit. If I move that handle up which you do to increase the current in a plating bath, what you actually did was to shorten up the resistance, cut out some of the resistance, and reduce the total resistance in the circuit—not by anything you have done in the tank at all, but by substracting some out of this series resistance. Now for flashing or other full line work, such as the plater calls running wide open, you throw the handle all the way around and your circuit is right through the rheostat and to all intents and purposes there is no resistance at all left in the rheostat. That is the way that thing ran. Such a rheostat was designed or rated to carry the maximum current that was expected of it when this arm stood just one segment cut in. It had enough resistance in it so that when the arm stood here, with all the resistance in the circuit, it had enough resistance in it presumably to reduce the line voltage, that is, to reduce the pressure, from anode to cathode, at its rated current, to one-half the generator voltage. In other words, it would cut your voltage down on a six volt circuit to three volts at rated current. Now the series rheostat has certain advantages—simplicity. You turn the lever around or back. One disadvantage was it was very difficult practically to put in enough segments, enough steps on the rheostat to give you a fair degree of regulation. In other words, you bought something to get pretty good regulation and found you had six or seven rather big steps and the variations of current you could get in your plating tank were coarse. And the reason it wasn't practical to put more steps on the series rheostat was because in order to do and to have the larger contracts necessary to carry the heavy currents, you would have to have a very

large, clumsy, and awkward, expensive rheostat.

Now to get around that, the parallel coil type rheostat was developed, and as adapted to plating rooms of course, it is an adaptation of the old parallel coil resistances used in the regulation of voltage in all meter testing rheostats by the electric light fellows for many years. There is nothing new about the principle. (Draws.) Now you see the diagram with this type of rheostat is exactly the same as the other. And this is exactly what I want to get to you men. This parallel coil type of rheostat does in a slightly different way for you what the series coil rheostat does, so I will use the same diagram in explaining it. Now it hasn't a lever, but it has a series of switches as I will show you in a few minutes, but I will show it in the diagram as having a lever. Now suppose we start moving the lever around in a circle, and suppose at this point here, two-thirds of the way around, let's say, it hits a stop post, it won't go any further. Then it must be evident that this part of the resistance beyond that stop post can never be cut out of the circuit. With this other resistance, we could swing the arm all the way around here and cut all the resistance out of the circuit. Now in the parallel coil type rheostat as ordinarily made, you have the same gradual reduction of resistance by manipulating the switches, but all of a sudden you come to a stop point and can't go any further. I want to show you why that is. (Draws.) Here we have a series of resistance coils in parallel. What do you do? Well, you close a switch and that would represent the series rheostat when we had moved it up a little bit. We close another, and we have reduced the resistance, because we have provided two parallel paths instead of one, by closing the second switch. Let's close a third switch. We have reduced it again. And let's close the fourth one. We have reduced it again. Now let's close the fifth one. There is no fifth. You see, we have come up against a stop post. We still have some resistance in our circuit; we can't get it out. That right there, is the second difference between the operation of the parallel coil type rheostat and the series coil rheostat, that is, the parallel coil type rheostat as it is customarily made. Now to get around that, you have to put in a short circuiting switch, which would have the same effect as closing a switch across that last piece of resistance, short-circuiting out the rheostat. But without the short-circuiting switch you can reduce your resistance in your parallel coil type rheostat to a certain degree and then you hit a stone

wall and can't go any farther. On the other hand, I told you that one of the advantages of the parallel coil type rheostat was the large number of steps and graduations available, and that is true, because for example, let's take this little diagram that I have shown here, with just four switches on it. Now with those four switches, you can get 15 steps, 15 separate resistance adjustments with four switches. If a fifth switch is added, another resistance coil here of proper dimensions, proper design, you would then get 31 steps, and with six switches, which is the minimum number generally used on parallel coil type rheostats, you can get 63 steps of graduation. So that the parallel coil rheostat, despite this limitation of the last piece of resistance, gives you enough different changes of resistance to make it worth while in the circuit.

Now, I want to refer to my diagram again of the plating bath circuit. I want to show you some of the very simple mathematics of rheostats in order to show you what they do and why they work and why they don't do some of the expected things, and it will only take me a few minutes to run through this discussion. Suppose we have this circuit as I have drawn on the board here, and we will assume that we have a plating bath here and certain other things. Now in order to enable me to put this story before you quickly, I have made certain assumptions that are perfectly logical and fair assumptions to make, and I will simply tell you what they are and show you how they work out. Now in the first case, I am assuming the voltage of the dynamo is six, and always stays at six. I am next assuming that we have a current of 200 amperes flowing in the circuit as shown on the ammeter. We have a cathode area in the tank of ten square feet. Right away you see if that is so we have an average current density on that cathode of 20 amperes per square foot. We will call that CD. We will assume that we adjust this rheostat to .015 ohms. I am going to call that RR, the resistance of the rheostat. Those are the assumptions that I want to make. Now let's take Ohm's law. It is customarily written, $-I = \frac{E}{R}$. That is familiar to all of you. There are two other forms in which that same thing can be written that are not quite so familiar but they are the same thing and I will just show them to you. The first one is this. You understand that mathematically, you can take any equation

and multiply both sides of this equation by the same thing without altering the equation. While I am working here with letters, the algebra as we call it is rather simple, and I think you will understand it easily. If I take this "I" and set it off a little ways so I can multiply it by an R, I come over to the other side of the equation and to be perfectly fair, I will multiply that same way, and I will have $\frac{ER}{R}$, and I haven't altered that equation in any way; its value is the same as it was before. But I have Ohm's law in a little more useful form, in a way that is simple for me to use in working out this rheostat problem. I now strike out the R's on the right side of the equation and I now have IR equals E, which is the same as the first one. IR equals E, which is the same as the first one. IR equals E. And there is a third way of writing it too, which I will also put down. This time I am going to take IR and divide it by I, which equals E, divided by I, and I cross out the first two I's, and now I have $R = \frac{E}{I}$. Therefore I have three forms of the same thing so that if I want to find out what I is, I put the factors that I have in my calculations or assumptions, in this equation and then solve it, and here is a sample of solving it for resistance. We will take this first assumption back here and solve a few of these things and see what it means. In the first place, suppose I want to find out from this data I have here how much of my electrical pressure I have thrown away, eaten up, going across the resistance. Here is the same chromium diagram I put on, and I have added in here a rheostat. I want to find out how much of my pressure I have dropped, or used up, going across that resistance. The current is 200 amperes. Multiply that by .015 ohms and we have 3 volts. Here it is over here. $R \times I = E$. Simply using that version of Ohm's law, I find under those conditions three volts have been used up crossing that resistance. Well we know before we start that this is a six volt circuit. Consequently, the voltage used up in crossing the plating bath was three volts. I am not trying to separate the IR drop or anode polarization through the solution and the cathode polarization, but the total voltage across that bath is three volts, and three volts across the rheostat, six volts total voltage of your dynamo. That is what you have under those conditions. You can see in a minute, if three volts is the drop

here, the resistance of that bath is this, 3 divided by 200 equals .015 ohms. So we find over here in solving this problem that under those conditions we would have three volts across the rheostat and three volts across the plating bath; then the plating bath would have a resistance, R, of the tank, which would also equal .015 ohms. That is your check.

Suppose now we made a change in this problem I have given to you. I said that we had ten square feet of surface running at 20 amperes per square foot. We had .015 ohms in the rheostat then. Now the change I want to make is this. I want to leave the rheostat exactly the way it is, and cut the cathode area one half. Your cathode area would then be five square feet, and the cathode resistance would go up to .03. It is doubled because there are only half the number of paths for the current to cross that tank. If that is the case, we will figure out now what happens. The current, I, would equal E over R. That would make it

$$\frac{6}{\begin{matrix}.015\\ \text{Plus } .03\end{matrix} = .045} = 133\tfrac{1}{3} \text{ amperes.}$$

You haven't changed the rheostat, you have changed the cathode area and your current would drop; but what would happen to the current density? 133⅓, divided by five, makes 24.6 amperes per square foot. In other words, your current density has gone up. Furthermore, you would find this, that where we originally had three volts drop in the first place, under this new condition of reducing the cathode area without changing the rheostat setting, you would find we now have 2 volts drop in your rheostat and 4 volts drop in your tank. It is something that you have done with the tank, nothing with the rheostat, that caused it.

Now in order to get this back, get these conditions back, suppose you wanted to maintain the 20 amperes per square foot, regardless of whether you have five square feet or ten in the tank. That is what the rheostat is for. The rheostat is to give you an opportunity of maintaining constant current density. How are you going to do it? Here is how you will do it. We know perfectly well if we want 20 amperes per square foot on five square feet of work, we have got 5 times twenty, and we must have flowing through our circuit 100 amperes. How are we going to do it? Here is how we will do it. Six volts divided by 100 amperes gives us .06 ohms. Now we know we must have somewhere, the total resistance in this circuit, must be .06 ohms. Well, if our 5 square

feet of surface gives us a resistance of .03, we get .06, subtract .03 from it and we know we have to have .03 left in the rheostat, or in other words, if we change the setting of the rheostat, change the switches around now until that rheostat gives you not .015 ohms, as it did originally, but change it until it gives you .03, that .03 added to the .03 of the cathode, the tank, you have your .06, you have here 100 amperes flowing, you have your 20 amperes per square foot, even on the reduced cathode area. That is how you manipulate the rheostat to compensate for the changes in the effective resistance and in the tank that are caused by an increase or decrease of cathode area, work area in the tank.

In closing, I want to explain one other thing which has puzzled many, and I am not surprised at it. You have all seen these parallel coil type rheostats, and you have all looked at the switches and noticed that they were marked a certain number of amperes and you have thrown a switch in and got nothing of the sort on the meter and wondered why the thunder it was that it didn't work; in other words, the meter didn't read right, or something had gone askew. That isn't true. What is true is that the marking of 20 amperes or 30 or 40 amperes on that switch is a perfectly good marking when you understand what that marking means. But as a prophecy of what is going to happen on the ammeter when that switch is thrown it is not very good. It has no meaning at all, as a prophecy. It has a different meaning entirely. And here is the point. All these parallel coil type rheostats, are designed, that is, those that are designed at all, are designed to do something. They have to be designed according to certain assumptions, and the assumptions generally made is that if you were to secure a rheostat which would give you a chance to cut the line voltage in half, as low as half, then you would have plenty of cut down in the rheostat, and by the same token, plenty of voltage left in the tank. So that those coils are designed on the so-called 6 volt rheostats to give a three volt drop at the current marked on the switch. But see here. I have just shown you that the thing to determine how much current was being dragged through this particular rheostat was that you did down here in the tank. The change that you make in your surface work is what actually tells whether or not this amount of current is going to be pulled through that coil. The coil merely promises that it will produce a three volt loss of pressure for you when that much current is dragged through it. That is all it promises. That is all that marking on

that switch can mean. It can't mean anything else. Now suppose we take this particular coil that I have shown here, let's see how that would be wound. That 30 ampere coil is going to drop three volts when 30 amperes are dragged through it. When the coil maker goes to wind it, he winds until he gets just one tenth of an ohm worth of resistance in that wire, and he chops it off and hangs it on some support. That is what he puts on there. Now once he has put the one tenth of an ohm on he has fulfilled his promise from Ohm's law; he has fulfilled the promise, that when you drag 30 amperes through that coil you get half line voltage in that rheostat. Suppose you don't pull so much through? Suppose you say, "Well, I think we will put twenty amperes through this thing. If you pull 20 amperes through that coil, of course you would get one tenth of an ohm multiplied by 20, or two volts drop through the coil, and naturally you would have four volts left across your tank, two volts through the rheostat, and not three volts. There would be a case where it is not giving you the three volts drop that it has promised to give you, but it didn't give it to you because you only drag 20 amperes through it. Suppose you dragged 40 amperes through it. Now you would get 4 volts drop through the rheostat, and would have only 2 left from anode to cathode in the tank. But you would have something worse. This coil is made to carry 30 amperes. You overload your tank, that is, you put in a sufficient area in the work to drag 40 amperes through there willy-nilly, and you immediately get 40 amperes going through a coil that is wound to carry without overheating only 30 amperes. You overload the coil, and it is red hot. And remember this, that a coil that is built to carry 30 amperes is made to carry 40 amperes, it does not get 40-30 hotter, but unfortunately it gets 40 $\times$ 40 divided by 30 $\times$ 30 hotter, and that is a good deal hotter, 4-3 you see is 1⅓, but 1600 divided by 900 is a good deal near 2 to 1. In other words, the overloading of that coil is closer to 2 to 1 than 1⅓ times, as the simple ratio would be. That is what happens when you draw through those coils a greater current than they are rated to carry. The coils can do certain things which I have attempted to outline to you, and those are all the things they can do.

(A rising vote of thanks extended to Mr. Taylor.)

Question:

I think one question would be in order. In that parallel coil rheostat, as you have explained it, when that is in your circuit, in

your six volt line, with all the switches closed, you would be getting the full benefit of the line, wouldn't you? All the resistance would be out and you would be getting all the juice.

Answer:

No. Suppose this rheostat was a 100 ampere rheostat. You close all the switches; you put enough work in the tank until the meter reads 100 amperes, with all the switches in there. You keep piling work in the tank until meter reads 100, the ammeter. Then in that case, at that time only, you would have 3 volts from your anode to your cathode, and 3 volts drop in your rheostat.

Question:

Supposing you had a small line and you wanted that rheostat to bring down the voltage—we will say you were depending on the amperes—but you wanted to plate something at a half a volt.

Answer:

You have six volts on your tank and you want to reduce the voltage to one half a volt. So we are going to have left in the circuit 5½ volts. How would you do it? That is the question you want to ask. All right. Now I am assuming this is a 100 ampere rheostat and supposed to fit a tank that takes 100 amperes when fully at work. You can't do it with that rheostat, because that rheostat is only designed to give you half line voltage drop when it is run up to its maximum current. If you wanted a rheostat to give you a 5½ volt drop through it leaving one half volt for the tank, your order to the rheostat maker would specify an eleven volt rheostat and that would do it. That is why the voltage marking on the rheostat unfortunately is rather misleading because if you had an eleven volt rheostat,—and put it on a six volt circuit, and you get 5½ volts drop through the rheostat, you would have a half volt left and that would give you what you are talking about.

Question:

Then you would have to put all these switches in to get 5½ voltage drop? These are all made, these coils, with different size wire here, your finer wire at one end and the coarser wire at the other?

Answer:

Yes, but they are for different currents. You put in enough switches for this half volt drop to give you whatever current you are dragging through by virtue of the area of the work in the tank. It is the area of the work in the tank that governs that.

## Philadelphia Branch

### Member's Problems

Question:

I would like to ask if anyone has a strip for steel plate on copper that won't damage the copper. I have tried muriatic acid, but it is not quick enough.

Answer:

You can accelerate that in your acid by putting a piece of copper in contact with it. In other words, take your steel face that you are trying to strip and put a piece of copper in contact with it beneath the surface of the liquid, and that will accelerate the action on the steel. It won't affect the copper. It might slightly mar the polish but it won't attack the copper chemically. You might also try a slightly stronger acid to increase the attack, but the copper won't be attacked with the straight muriatic acid.

Question:

But wouldn't that also depend on how much steel went in there? Won't that start another action afterwards which would help to attack the copper? On a brand new one, first put up, it won't attack the copper, but other stuff gets into that muriatic acid that starts a separate chemical action on the copper. It may be you have to change the strip often.

Answer:

I use a fresh strip every time.

Question:

Another question has been brought up during the past month, how to take excess zinc out of a nickel bath. Has anybody had that experience? The reason I am asking that question is because sooner or later there is going to be a lot of people ask the same question. We are plating die castings and we only plate one part of the die castings. We don't plate the complete die casting. In other words, certain of that die casting stays exposed in a nickel solution and after a run of 25,000 or 30,000 pieces of zinc through the nickel solution, the acid in there will dissolve some of that zinc. It only has to dissolve a small part off each one to make something. When that runs for a month, you have got quite a lot of zinc in that solution whether you think so or not. That may be one of the causes why some people have trouble with streaks in the plating of die castings, because when those streaks start that is when your zinc is starting to be eaten up and going

into solution. Now if we could take out the zinc as fast as we dissolve it in the solution I think we would accomplish something in the line of plating die castings so a plater won't have to worry about black streaks.

Answer:

Won't acetic acid take up all the zinc in the solution? If you take carbonated zinc and add it to acetic acid you can see it very easily eaten up.

Question:

Would the acetic acid precipitate it or dissolve it?

Answer:

It would throw it to the bottom and take it out of the solution that far.

Answer:

In your nickel solution you couldn't add enough acetic acid to do it by that method, if it works. There has been one method that succeeded,—if you will throw your solution over on the alkaline side, raise your P H up to about 6.6 or 6.8, in around there, by taking precipitated chalk or lime and mixing it up in water and making a paste and adding an excess of that to your nickel solution and stirring it, and if possible, warming your solution, so that the precipitated matter that forms in there will settle, you can throw out most of your impurities including copper, zinc and iron. Some of your nickel will be thrown out as basic salt, but you can purify a solution that way. Allow it to stand for say three or four hours, warmed if possible, and then siphon off the clear liquid from the top and throw the sludge with the solution that stays with it down the sewer, and make up a new solution from what was drawn off. By the time you get through doing that, though, you will be asking yourself whether it is worth doing it at all. In fact a number of concerns that I know do die casting work in great quantities find it more economical to throw the solution away when it gets seriously contaminated rather than to try to reclaim it.

Question:

Has anybody else any suggestions on that?

Suggestion:

Bob McClatchey might be able to help you on that.

Answer:

His cure was sodium sulphate but that don't take the zinc out.

He still has it. Another thing, he wouldn't have trouble in this respect. Bob McClatchey nickel plates his entire article, strikes it first, and once the casting has been coated there is no dissolving of zinc. But there are particles of zinc, from little hollows and deep inserts, that don't get plated. The zinc will dissolve and get out in the solution.

Question:

By keeping your P H about 6 and keeping your solution neutral you won't have much tendency to get the zinc in the solution, will you?

Answer:

Yes, it does, same as your zinc will go in a caustic solution.

## CLEVELAND BRANCH

The regular monthly meeting was called to order at 8:30 by President McCormick. The minutes of previous meeting were approved as read. We then installed our officers for the next year by a neat little speech and compliment to each officer by our retiring president, B. F. McCormick.

We are sorry to say that Mr. R. H. Slitor, one of our charter members, is still a very sick man, but if the wishing of the members of Cleveland Branch can do any good, he will soon be hopping about as usual.

Mr. Singler, our picnic man, then got busy with a motion to have a picnic at Puritas Springs Park, July 29, and wants to rob the treasury, he having just served on the Auditing Committee and knew that we had the money; but we let him have his way and expect to have all our members there and have a good time. Come and help to spend your money!

H. J. TerDoest, Secy.-Treas.

## NEWARK BRANCH

Our June 15, 1928, meeting was well attended. Plans for the fishing trip Friday, August 11, were completed and all those attending are requested to meet at Franklin Hall meeting room at 5 p. m. There will be ample autos to take the members who signified their intentions of going. Chairman Horace Smith promises a good time and plenty of fish.

Mr. Samuel Taylor, our librarian, gave a short talk on Etching of Dies, and promises to put his talk on paper and to be printed in the "Review."

Discussion on Chromium took place and Mr. Sharkey related a conversation he had recently with a chemist from Germany, who stated that Chromium was being deposited by radiofrequency. Mr. Sharkey promises to try and secure him for a speaker at one of our meetings shortly.

Adjourned at 10:15 p. m.

Royal F. Clark, Secy.-Treas.

## HARTFORD-CONNECTICUT VALLEY BRANCH

Hartford-Connecticut Valley Branch met on Monday, July. 9th, at the laboratory of the Junior Achievement League in Springfield, Mass. In spite of its being the hottest day so far this summer, there was a good attendance of both Springfield and Hartford members.

It was voted to pay the research committee $100 to complete our three-year pledge of $50 a year for this work.

The committee in charge of our recent banquet reported all bills paid and was discharged with a vote of thanks.

The delegates from this branch to the Toronto convention reported a very successful convention and a most enjoyable visit to Toronto. They were much impressed by the cordial hospitality shown them by the members of Toronto Branch and the people of Toronto. Congratulations were extended to Wm. J. R. Kennedy of this branch on his election as second vice-president of the society.

Following the business meeting, Mr. Buckner, industrial director of the Junior Achievement League, told us of the work of that organization, which is engaged in helping boys acquire practical experience in various kinds of industrial work. It's most recent undertaking is a class in electroplating which is being held in Springfield and which, if successful, will be extended to other New England cities. Harford-Connecticut Valley Branch has offered to help this movement in whatever way possible and in return has been offered the use of the League's laboratory for their meetings.

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## BRIDGEPORT BRANCH

Meeting called to order by Vice-President Wagstaff. The roll call of officers were read, four officers were absent. The minutes of the last meeting were read and accepted. Under new business, the dropping of four members for non-payment of dues to place. Also our annual outing came up, which was held over from the last meeting; it was voted that we hold an outing, and a committee be appointed by the chair. The chair appointed the following committee: Ray O'Conner, chairman; Wm. Flaherty, Wm. Straton, George Wagstaff, John C. Oberender and George Karl. Due to the small attendance, the subject of good and welfare was not brought up. Treasurer's report was accepted as read. Meeting adjourned at 9:30 o'clock.

Wm. A. Ehrencrona, Secy.-Treas.

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## DETROIT BRANCH

Regular meeting of Detroit Branch A. E. S. held its regular meeting July 11, 1928 at the Detroit Testing Laboratory.

Our newly elected president, Mr. E. V. Allen, presiding. The attendance was small due to a very warm evening. Detroit Branch has adopted the Question Box which will no doubt be very successful.

Chas. M. Phillips,
13421 Camden Ave.,
Secretary & Treasurer.

## CHICAGO BRANCH

Regular monthly meeting Chicago Branch held July 14th at the Atlantic Hotel. Meeting was called to order, President Meyers presiding, with a fair attendance.

Past Supreme President F. J. Hanlon made the report for the Delegates on the Convention and it was one of the best reports that was ever received by the Branch, and the members appreciated it, for they were able to understand most everything that had taken place in the convention hall.

O. E. Servis, our librarian, made several very interesting remarks; also asked members to suggest different subjects to make the meeting more interesting.

Again the Grim Reaper reached into our midsts and called unto that branch higher than our own two members of Chicago Branch, in the death of Matt Butzen, Jr., and John Satka. The Branch will feel their loss, as they were always ready to assist their fellow members. To their families and friends Chicago Branch extends its heartfelt sympathy.

The regular order of business being completed, the Librarian conducted the balance of the meeting, and found the following questions in the Question Box:

Ques. 1—What causes Chromium plate to apparently disappear after in use for some time—noticeable over nickel deposit?

Ans. 1—It was thought that Chromium deposit was too light.

Ques. 2—What method can be used to successfully nickel plate die castings of the following compositions: copper 4.5%, iron 2.0%, nickel 4.5%, silicon 1.5%, aluminum 87.5%, castings run in service at 700 degrees F.?

Ans. 2—Low metal contents with high per cent of Sodium Sulphate, this subject will be discussed at our next meeting.

Ques. 3—In determining Chlorine in nickel, bath if Silver Nitrate is used, which indicator is best? How would you throw out nickel so green color will not interfere with end points?

Ans. 3—Use dilute solution of Bi-Chromate of Potash.

Ques. 4—What is the best to produce the mottled Barbediene bronze finish on brass?

Ans. 4—Sulphurette or antimony solution strippled with weak cyanide solution, then restrain lightly.

Ques. 5—What dip will make a smooth white finish on sheet aluminum?

Ans. 5—Water, 1 gallon Hydrofloric acid, 1 pint Sulphuric acid, run through cleaner first before going into dip.

Ques. 6—Is it best to line a Chromium tank of steel with glass; also what is the best Chromium formula now in use?

Ans. 6—It was suggested it was best to glass-line tank. As to

formula, there are several in our Review. The plater can use the one he prefers.

Ques. 7—What causes the formation of a slime and moldy substance to form on a nickel solution that is used about once a week? Tank is covered when not in use. How can it be prevented?

Ans. 7—Use a small amount of Hydrofloric acid.

Meeting adjourned at 10:30. S. J. C. Trapp, Secy.-Treas.

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## REINSTATEMENTS

| | Branch |
|---|---|
| P. L. Sumfell, % Ulley & Pratt Co., Essex, Conn. | Hart.-Conn. Valley |

## SUSPENSIONS

| | Branch |
|---|---|
| Albert T. Davey, 563 Annette St., Toronto, Can. | Toronto |

## DEATHS

| | Branch |
|---|---|
| Matt Butzen, Jr. | Chicago |
| John Satka | Chicago |
| John Ainslee, 339 St. Peter St., Sherbrooke, Can. | Montreal |

## APPLICATIONS

| | Branch |
|---|---|
| John English (no address) | Bridgeport |
| Fred Rickershauer, 30 43rd St., Irvington, N. J. | Newark |

## ELECTIONS

| | Branch |
|---|---|
| Albert O. Ciske, 647 Aldine Ave., Chicago, Ill. | Chicago |
| I. Mershon, 3810 15th Ave., Brooklyn, N. Y. | New York |
| Wm. A. Harb, 232 East 22nd St., New York, N. Y. | New York |
| Mr. J. Reingold, 673 Saratoga Ave., Brooklyn, N. Y. | New York |
| Laurence A. Sheridan, 1033 Emma St., Elizabeth, N. J. | Newark |
| E. R. MacNicholl, International Silver Co., Meridan Conn. | Hart.-Conn. Valley |
| Jno. B. Dickson, % A. G. Spaulding & Bros. Co., Chicopee, Mass. | Hart.-Conn. Valley |
| J. A. Sederlund, % Rolls Royce Co., Springfield, Mass. | Hart.-Conn. Valley |
| Harold L. Farber, 2715 Ontarion Rd., N. W., Washington, D. C. | Dayton |
| Ralph J. Paddock, 280 Preble Ave., N. S., Pittsburgh, Pa. | Pittsburgh |
| John Jacques, 132 Muamonte, Ontario, California | St. Louis |
| Leo DeMars, 1504 Washburn Ave., N., Minneapolis, Minn. | St. Louis |
| Henry Mahlstedt, 105 Coniston Ave., Waterbury, Conn. | Waterbury |
| Wm. E. O'Berg, 2191 W. 29th St., Cleveland, Ohio. | Cleveland |
| Henry Achin, 3516 Clark St., Montreal, Canada | Montreal |
| Wm. M. Fisher, 654 Gordon, Reading, Pa. | Philadelphia |
| Arthur G. Pierdon, 925 E St., Washington, D. C. | Balti.-Washington |
| Ford S. Holden, Geneva, Ohio. | Cleveland |
| John C. Schmotzer, 4321 Marvin Ave., Cleveland, O. | Cleveland |

# A. E. S. PAGE

## Assembled Expert Scraps With and Without Significance

*U. S. Picks Gold Out of the Air—*

Picking gold out of the air is a new process of economy practiced by the U. S. Government. In its New York assay office an electrical apparatus collects fine particles of gold that would otherwise be released into the air of the city through a smoke stack. Out of 5,000 lbs. of dust gathered from the fumes of the assay plant, $12,400 worth of gold had been reclaimed, the office announced. The process is about the same as that used by many industrial plants to reduce the smoke nuisance by discharging an electric current across smoke stacks to catch particles of coal and dirt from the smoke, depositing them against a negatively charged plate from which they are dropped or scrapped into a bin. The gold is collected similarly. — *Edison Service News.*

Nurse: "Yes, you were kept alive for three weeks on brandy."

Patient: "Just my luck—me being unconscious all the time."

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Here's to the Platers of the
A. E. S.,
Who conquer all troubles
when in distress;
The troubles they have don't
make them feel blue
Because they read the good
articles in the *Monthly Review.*

—Henry Wandtke,
Toledo Branch.

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*Isn't It So?*

The only way you can get some men to the front would be by kicking them in the rear.

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The theory that beauty is only skin deep is very comforting to those who haven't any.

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Many a man's reputation depends upon what isn't found out about him.

## ANNUAL MEETING OF THE AMERICAN ELECTRO-PLATERS' SOCIETY

### The Sixteenth Annual Convention of the American Electroplaters' Society in Toronto, Canada, June 25-28, a Great Success

**By Walter S. Barrows**

Past Pres. A. E. S., Associate Editor and Secretary of the Convention Committee

(Written Especially for the Monthly Review)

The corridors of the King Edward Hotel, Toronto, Canada, were echoing happy salutations, snappy handshakes, jolly laughter and sincere expressions of cordial welcome early on Monday morning, June 25th. The mezzanine floor, with its spacious areas, provided an ideal location for the several indoor features of the meeting. Entering this area, the delegates and visitors approached the registration desk and received their badges, books of tickets, programs.

#### A Tribute to Dr. Blum

A specially pleasant feature of the evening was the presentation of a gold watch to Dr. Wm. Blum, Chemist, Bureau of Standards, Washington, D. C. The watch was a gift from the entire A. E. S. of the United States and Canada, indicating the deeply rooted love and admiration for the recipient, who has untiringly devoted himself to the innumerable problems of the electroplating industry, supply manufacturers, and students during many years. Dr. Blum was truly taken by surprise, and very feelingly responded to the presentation speech of George B. Hogaboom.

President John H. Feeley presented the prizes awarded for the best papers and platers exhibits, including the Founders Gold Medal.

A nine-piece orchestra under the supervision of Charles Musgrave provided music throughout the evening. Balloons, paper hats, etc., added to the hilarity and spectacular color of the scene. At the conclusion of the entertainment, the floor was cleared and dancing was enjoyed until 1 A. M., rounding out six hours of solid fun. The Egyptian Lacquer Company presented each person with a beautiful pack of playing cards and case.

#### Entertainment for Ladies

The ladies attending the convention were provided with special entertainment during the afternoons and evenings while the men were attending educational or business sessions. Monday afternoon, June 25, more than 80 ladies visited the department store of

the T. Eaton Company and were escorted through the various factories operated by the company. At the conclusion of the tour, afternoon tea was served in the Georgian Room of the T. Eaton Company. Monday evening over one hundred ladies were entertained at cards in the Yellow Room, King Edward Hotel. Bridge and euchre made the formation of new acquaintances easy. Supper was serve at ten o'clock.

Prize winners at Euchre were:

1st Prize, Mrs. C. J. Menzemer, with a score of 34.

2nd Prize, Mrs. A. Sheperd, with a score of 15.

Mrs. Erwin Sohn won the prize at bridge, with a score of 1400.

Wednesday afternoon a theatre party consisting of over one hundred ladies were entertained at Shea's Hippodrome. As no entertainment feature was scheduled for morning hours, the ladies were able to get their beauty sleep while hubby took a bun and coffee from the arm of a chair in one of the several convenient restaurants. The number of ladies registered was 110. Mrs. Walter S. Barrows, assisted by Mrs. James Vallier, Mrs. J. Acheson, Mrs. T. O'Keefe, Mrs. Joseph Ellis, Mrs. Henry Wallace, Mrs. John Walker, Mrs. John Lougheed, Mrs. Benjamin Deakin, Mrs. W. Sutherland and Mrs. E. Coles, of the ladies committee, were collectively and individually attentive to the ladies' comforts and pleasure.

**Past Presidents Meet**

The Past Presidents' Association held their annual meeting and dinner in the King Edward Hotel, Monday evening, June 25, at 6 o'clock. John H. Feeley was inducted into the ranks, and felicitations were forwarded to Richard H. Sliter, Cleveland, Ohio, a member who has been seriously ill for several months past.

**New Officers of the A. E. S.**

The closing session of the convention was held Thursday morning, June 28, with President J. H. Feeley in the chair.

Officers elected for the ensuing year were:

President—Horace H. Smith, Newark, New Jersey.

1st Vice President—Clarence VanDerau, Mansfield, Ohio.

2nd Vice President—W. J. Kennedy, Hartford-Connecticut Valley Branch, Hartford, Conn.

Secretary-Treasurer—George Gehling, Philadelphia, Pa.

Editor, Monthly Review—Frank J. Hanlon, Chicago, Ill.

The newly elected officers were then installed by Charles H. Proctor—Founder of the Society.

### 1929 Convention to Be Held in Detroit

The selection of the convention city for 1929 was not without opposition. Three invitations were considered. New York Branch presented several reasons why the next convention should be held in their city. Detroit Branch members had been actively engaged during the convention in dispensing alluring inducements to the delegates and they entered the arena prepared to secure the annual. West Baden, Indiana, had a representative on the scene and the tussle began. But—New York with her immense proportions and many wonderful advantages and West Baden, with its health promoting, restful isolation, lost out in the grand final encounter. Detroit with its industrial progressiveness and several other attractions of particular interest to a great majority of platers, bagged the game. Therefore the Seventeenth Annual Convention, marking the twentieth anniversary of the Society, will be held in Detroit, Michigan, in 1929.

### Miscellaneous Events of Interest

A two-hour motor coach tour of Toronto, Thursday afternoon, June 28, completed the program. Prof. W. Lash Miller, chief of the Department of Chemistry, University of Toronto, and an honorary member of the American Electroplaters' Society, entertained members of the executive board of the Society, the Toronto Convention Executive Committee and a few others at dinner in Hart House, Thursday evening, June 28, when George Gehling made his initial bow on the stage of Hart House Theatre, in that pathetic little melodrama entitled, "The Bee and the Cow."

The total official registration at the convention was 428; the total estimated attendance exceeded 450. Delegates and visitors were unstinting in their praise and expressions of satisfaction and delight over the entertainment and educational program, the hospitality and consideration accorded them by Toronto Branch; and the Sixteenth Annual Convention was declared to be a truly successful event, unique in several respects, equalled by few and excelled by none.

Frank J. Hanlon was constantly being mistaken for a Baptist minister while he mixed with the clergy in the Lobby.

Wonder where Wilson White lost his connection with Elmer Gantry; the page boy failed to locate him.

Miss Marcia Rogan was the official reporter again this year.

Mrs. Bast, Bucyrus, Ohio, the only woman possessing active membership in the Society, was prominent throughout the convention.

## IMPRESSIONS OF THE ANNUAL CONVENTION

### Extract from The Metal Industry

**By Charles H. Proctor**
Plating-Chemical Editor

The annual convention held at Toronto is just a memory now, but what a splendid memory to carry in Memory's Garden until the next annual convention in Detroit in 1929. There was a great attendance. Every one you met seemed to have that enduring smile that lingers. Was it because they found more Liberty in Canada than in the United States?

The papers presented at the convention were of a high class and covered subjects interesting to the practical plater as well as the electrochemist. Each year it seems that the papers presented are better prepared. The entertainments for both gentlemen and ladies were splendid and well carried out. The weather during the entire convention was beautiful and exhilarating.

The steamer trip across Lake Ontario and up the Niagara River to Lewiston, New York, on the splendid steamer Cayuga of the Canadian Steamship Co. will always be remembered; then through the Niagara Gorge, on to Niagara Falls, New York and Niagara Falls, Canada; then in the evening the Niagara Falls illuminated. What a splendid sight! Then we went back again to Toronto. It is all a memory now, but it will live on and on.

Much credit is due to the Executive Committee, John Acheson, W. S. Barrows, John Walker and Thomas O'Keefe. The splendid ovation they received at the closing of the convention assures them that they and all members of the several committees, both ladies and gentlemen, share in the great tribute that every visitor to the convention is only too glad to convey to them.

And now to the future of the society. Its doors must be opened wider and still wider so that all can enter its portals who are interested in its future welfare. The Society, to grow, must have a continual healthy addition to its membership list. We must all look to the future. As the years come and go the men who stood at the helm of the ship through its early history, through storm and sunshine, will pass on towards the Great Unknown. They will not return, so at the next Annual Convention at Detroit, Mich.,

have all the constitutional amendments so arranged that they will be broad in their scope for the good of the Society.

Admit electrochemists who have had chemical supervision of electroplating plants for three years, as active members. Admit assistant foreman platers as associate members who have held this position for at least three years and can be vouched for by the firm with whom they are employed.

The assistant foreman plater must eventually become the foreman plater and it is to him in the future that we must look to carry on the work of the Society if the active members of today desire the Society to continue on as a foreman platers Society.

Let us all look forward to the future. The past is nothing in the face of the stern today. And then if we have foresight the Society will grow and its leaders will reap the reward of a work well and faithfully accomplished.

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## MR. PROCTOR GOES ABROAD

Mr. and Mrs. Charles H. Proctor of Arlington, N. J., will leave on Saturday, July 14th, for a trip to Europe on the "Cunarder" Tuscania, leaving at midnight on July 13th. They anticipate visiting England, France, Germany and Holland. Mr. Proctor goes to Europe in search of health and a well-earned rest. His last trip to Europe was in 1886.

He will, however, continue to look for information on the progress made in electroplating in the several countries he and Mrs. Proctor will visit.

## NOTICE TO BRANCHES

**Kindly send in to Editor's Office before August issue, Aug. 15th, names of secretary and meeting place and nights as the directory will be issued then and it will be necessary to O.K. corrections prior to then.**

**—EDITOR.**